

الف) $a_n = a_1 \times q^{n-1} = \frac{1}{2} (2)^{n-1} \Rightarrow a_{10} = \frac{1}{2} \times 2^9 = \boxed{256}$ ب) $\frac{a_{10}}{a_1} = \frac{256}{\frac{1}{2}} = 2^9 = 512$ ج) $\sqrt{a_1 \times a_{10}} = a_5 \Rightarrow \frac{1}{2} (2)^5 = \boxed{16}$ د) $a_n = \frac{1}{2} \times 2^n = \boxed{128} \rightarrow 2^7 = 128 \rightarrow n = 7$	۱
$\frac{a_1}{a_5} = q^4 = \frac{96}{12} = 8 \Rightarrow q = 2$ $a_{10} = a_1 \times q^9 = 96 \times 8 = \boxed{768}$	۲
الف) $(a_3)^5 = 243$ $a_3 = \boxed{3}$ ب) $a_1 \times a_5 = (a_3)^2 \Rightarrow 2^2 = \boxed{4}$	۳
$(\sqrt[5]{2})^2 = 2^{\frac{2}{5}} \times 2^{\frac{3}{5}}$ $\hookrightarrow 2^{\frac{2}{5} + \frac{3}{5}} = 2^1 = 2$ $a+b=5$ $\frac{a+b}{2} = \frac{5}{2} = 2,5$	۴
الف) $n^r = (1-u)(n+1)$ $u^r = 1 - n^r$ $2n^r = 1$ $n^r = \frac{1}{2}$ $\sqrt[n]{n^r} = \sqrt[n]{\frac{1}{2}} = \frac{1}{\sqrt[n]{2}}$ ب) $\frac{a_v}{a_w} = \frac{a_{11}}{a_1} = \frac{2^{\frac{11}{2}}}{2^{\frac{1}{2}}} = \frac{2^{\frac{10}{2}}}{1} = 2^5 = 32$ ج) $\frac{a_{11}}{a_1} = \frac{2^{\frac{11}{2}}}{2^{\frac{1}{2}}} = 2^5 = 32$ د) $\frac{a_{11}}{a_1} = \frac{2^{\frac{11}{2}}}{2^{\frac{1}{2}}} = 2^5 = 32$ ه) $\frac{a_{11}}{a_1} = \frac{2^{\frac{11}{2}}}{2^{\frac{1}{2}}} = 2^5 = 32$	۵

$$a_1 + a_1 q = 2a_1 = a_1(q^2 + 1)$$

$$a_1 q + a_1 q^2 = 1^2 = a_1 q(q+1)$$

$$a = \frac{1}{q} \rightarrow a_1 = 2u, a_2 = 3, 1$$

$$q = 3 \rightarrow a_1 = 1, a_2 = 3, 2u$$

$$\frac{x(a^2+1) - (q+1)(a^2-q+1)}{xq(q+1)} = \frac{q^2-q+1}{a} \cdot \frac{21}{1^2} = \frac{42}{3}$$

$$3q^2 - 3q + 3 = 4q$$

$$3q^2 - 10q + 3 = 0 \quad (a-q)(q-1)$$

$$(3q-1)(q-3) = 0$$

$$q = \frac{1}{3}, q = 3$$

$$a_1 \times a_2 \times a_3 = 2u \rightarrow a_1 = 3u \rightarrow a_2 = 3$$

$$\frac{3}{q} + 3 + 3q = 1^2 \rightarrow \left(\frac{3}{q} + 3q = 1\right) \rightarrow 3 + 3q^2 = 10q \rightarrow 3q^2 - 10q + 3 = 0$$

$$\frac{q=3}{q=\frac{1}{3}} \rightarrow \begin{matrix} 1, 3, 9 \\ 9, 3, 1 \end{matrix}$$

$$q^2 - 10q + 3 = 0 \quad (q-1)(q-3)$$

$$\omega \rightarrow q = \frac{1}{3}, q = 3$$

$$S_{10} = a_1 \left(\frac{q^{10} - 1}{q - 1} \right) = 1^2 \left(\frac{3^{10} - 1}{3 - 1} \right) = 3^{10} - 1 = 59049 - 1 = 59048$$

$$a, aq, aq^2, aq^3, aq^4, \dots$$

$$aq - a, aq^2 - aq, aq^3 - aq^2, aq^4 - aq^3, \dots$$

$$a(q-1), aq(q-1), aq^2(q-1), aq^3(q-1), \dots$$

$$\xrightarrow{\times q} \quad \xrightarrow{\times q} \Rightarrow \text{قد رشت می شود}$$

$$S_n = a_1 + a_1 q + a_1 q^2 + a_1 q^3 + a_1 q^4 + \dots$$

$$qS_n = a_1 q + a_1 q^2 + a_1 q^3 + a_1 q^4 + a_1 q^5 + \dots$$

$$qS_n - S_n = a_1 q^n - a_1$$

$$S_n(q-1) = a_1(q^n - 1)$$

$$S_n = \frac{a_1(q^n - 1)}{q-1}$$

$$a_n = a_1 + (n-1)d$$

$$S_n = a_1 + (a_1 + d) + (a_1 + 2d) + \dots + (a_1 + (n-1)d)$$

$$\rightarrow \frac{n(n-1)}{2} d + na_1$$

$$\frac{n}{2} (2a_1 + (n-1)d)$$